

South Carolina AWOP Annual Report for 2009

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Prepared For:

**U.S. EPA Region 4 Multi-State
Area Wide Optimization Program**

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Maintaining The Program

Since 1997, the South Carolina Department of Health and Environmental Control (DHEC) has continued to participate in EPA's Region 4 Multi-State Area-Wide Optimization Program (AWOP). The goal of the program is to maximize public health protection by optimizing particulate removal and disinfection by-product formation at all surface water treatment plants.

Identify & Address Institutional Challenges

The increasing amount of time spent on compliance activities related to EPA and state regulations has drastically reduced the amount of time spent on Optimization activities. Several changes are being implemented to combat this shortfall. We now have a staff member that will be assisting small systems with routine technical assistance issues like required paperwork and administrative requirements (distribution program SOP's, general recordkeeping, sanitary survey follow up, etc.). In addition, our small systems coordinator continues to provide technical assistance to ground water systems in areas of survey follow up, system operations, and emergency disinfection after positive bacteria samples.

Internal Support

Internal support for the program remains high. Staff have not been restricted from traveling to meetings or providing optimization assistance to water systems in state, or other state optimization programs. Funding for equipment needs has also not been a problem.

The optimization program continues to serve as a model for other Department programs to do more with less, i.e. getting the most out of what you have. "Optimization thinking" has been encouraged in other program areas. Because AWOP in South Carolina bridges across several sections (compliance, monitoring, permitting, State Revolving Fund (SRF)), managers in the other programs have been exposed to AWOP and made aware of the successes.

South Carolina has had numerous budget cuts (~ 40 %) for the past two years. Despite these cuts, management remains committed to the Program. Most of the funding for the SC program comes from the SRF program and their support also remains high. Since AWOP is included in the Agency's strategic plan, AWOP variables are tracked and reported to the Agency management in an annual report.

Core Team Structure & Capacity

South Carolina's Core AWOP Team Members

AWOP Team Member	Position	CPE Training Status
Richard Welch, PE	Section Manager	Complete
Bill Randolph	Environmental Engineer	Complete
Lindsey Bounds	Environmental Engineer	Complete
Rick Hiers	Environmental Engineer	1 CPE's remaining
Theresa Penney	Environmental Engineer	3 CPE's remaining
*Fred Taylor	Environmental Scientist	Complete
**Shannon Berry	Environmental Scientist\Trainer	3 CPE's remaining

*A-level certified water treatment plant operator.

** Certified environmental trainer.

After completing the DBP PBT pilot study, each team member has been exposed to and honed skills related to jar test calibration, chemical pump feed calibration, as well as tracking spreadsheet use and troubleshooting at plants. This experience has all been hands-on and has been beneficial to developing a competent technical staff. This increased competency has made regulatory compliance efforts easier.

Plant Status

Prioritized List of Plants

As demonstrated with past annual reports, South Carolina continues to show microbial optimization success at our surface water treatment plants. The table below shows the current list of the worst performing plants and performance numbers for 2009. In addition, the table shows the corresponding water system ranking in 2008.

Microbial Status Component

2009 Rank	System/Plant Name	Reason Not Optimized	Ongoing or Planned Action	2008 Rank
1	Belton Honea Path	Settled 6.9 (2), filtered 0.14	None	4
2	Batesburg-Leesville	Settled 3.3 (2), filtered 0.13	Plans for new source/plant	1
3	York	Filtered 0.22	Technical assistance	3
4	Mohawk Industries	Filtered 0.17	None	10
5	McCormick	Filtered 0.14	Technical assistance	16
6	Whitmire	Settled 2.5 (2), flashy river source	Technical assistance	6
7	Westminster	Settled 2.6 (2)	Technical assistance	2
8	Columbia – Canal	3 days max filtered > 1 (met goals)	Possible CPE	13
9	Beaufort – Chelsea	Flashy source (met goals)	None	5
10	Abbeville	Filtered 0.16	Filter rehab project planned	35

The Disinfection By-Products (DBP) status component includes data from all of the water systems that treat surface water. A scoring and ranking system has been developed for the DBP status component. The DBP goals used to determine optimization in South Carolina were developed by the EPA Technical Support Center. Disinfection by-product data is collected by DHEC, and input into spreadsheets. To determine optimization with respect to the DBP goals, locational running annual averages (LRAA's) are calculated and the maximum LRAA is taken from each location for a 1-year period. All of the maximums are averaged and the average of these maximums must be less than 60 ug/l for THM's and less than 40 ug/l for HAA's.

DBP Status Component

2009 Rank	System/Plant Name	Reason Not Optimized	Ongoing or Planned Action	2008 Rank
1	Catawba River	THM MCL violation (81/55)*	Conversion to chloramines	4
2	Newberry County	TOC violation (0.9)	Enforcement/tech assist	18
3	Winnsboro	(64/50)		10
4	York	(78/39)	Technical assistance	20
5	Aiken	HAA issues (80)		1
6	Bennettsville	HAA issues (77)	Blending w/ ground water	3
7	Belton Honea Path	(69/64)		6
8	Edgefield	(61/64)		7
9	Laurens	THM MCL violation (102/37)	Technical assistance	8
10	Pickens	(65/63)		9

*(81/55) means THM RAA was 81 ug/L and HAA RAA was 55 ug/L

The optimization program is discussed during the annual sanitary survey at each surface water treatment plant. Charts and data are presented and discussed for the time period since the last survey of that water system. The sanitary survey report also contains an in-depth section on optimization and reporting of plant performance

Microbial Ranking Criteria

The SC AWOP team has developed a priority ranking system to facilitate surface water systems prioritization with respect to public health risk potential. This system has been very successful and it has been reevaluated several times since development. The prioritization allows the team to apply resources and optimization tools where the need is greatest. The scoring worksheet used to evaluate each plant takes into account a 2-year regulatory compliance (MCL, treatment technique); sanitary survey results from a 2-year period, and operational data (turbidity measurements) taken over a 1-year period. Using this worksheet has allowed the team to focus on those systems that have the greatest need for optimized performance.

Microbial Optimization Worksheet

2-year regulatory compliance	Points (Per #)	Results of last 2 Sanitary Surveys	Points (Per #)
# Acute MCL violations	40	# Overall Unsatisfactory surveys	40
# MCL violations	20	# Overall needs improvement surveys	20
# Treatment technique violations	20	# Individual items unsatisfactory	10
		# Individual items needs improvement	5

Operational Data based on 1-year

Filtered Turbidity		Settled Turbidity		Raw Turbidity	
# days > 1 NTU	20	# days > 10 NTU	5	# days > 250 NTU	5
# days > 0.5 NTU	10	# days > 5 NTU	2	# days > 100 NTU	2
# days > 0.3 NTU	2	# days > 2 NTU	0.5	# days > 50 NTU	1
# days > 0.1 NTU	1			# days > 25 NTU	0.5
Is plant operated 24/hr day?				No = 20	
Does plant have more than one clearwell?				No = 20	

DBP Ranking Criteria

A scoring and ranking system was developed for the DBP status component. The DBP goals used to determine optimization were developed by the EPA Technical Support Center. Disinfection by-product data is collected by the team and input into spreadsheets. To determine optimization with respect to the DBP goals, locational running annual averages (LRAA's) are calculated and the maximum LRAA is taken from each location for a 1-year period. All of the maximums are averaged and the average of these maximums must be less than 60 ug/l for THM's and less than 40 ug/l for HAA's.

DBP Optimization Determination Worksheet (example data)

System Name	Sample Site	2006				2007			
		Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
	1	27	69	101	44	24	59	120	35
	2	30	75	95	53	35	90	128	55
	3	29	52	78	41	21	50	98	37
	4	25	79	105	53	21	36	90	26
	LRAA 1	4 Quarters are for site 1			60	60	57	62	60
	LRAA 2	“ “			63	65	68	77	77
	LRAA 3	“ “			50	48	48	53	52
	LRAA 4	“ “			66	65	54	50	43
MAX LRAA	Max from any site			66	65	68	77	77	
Avg of Max LRAA's								71	
DBP Goal								60	

A priority-ranking list was developed for the DBP status component that shows which systems need the most optimization help and staff resources. Points are earned from regulatory compliance, sanitary survey performance, performance with respect to optimization (DBP levels), and formation potential (TOC performance). Systems earn the most points from the operational performance data. Like the microbial priority ranking, the higher DBP scores reflect worse optimization performance.

TPI Implementation

List of Activities

During the past 12 months, DHEC's AWOP team has facilitated and participated in numerous technical assistance and optimization activities. The table below represents some of the major achievements during this time.

Date	Activity	Topics/Results
Jan 09	SC AWOP Integration Pilot Project	Program Exposure
Jan 09	SC AWOP PBT DBP Project - One-Year Follow-up Session	Reporting on Success & Program Exposure
Jan 09	Presentation at Southeastern Regional Technology Transfer Conference	Program Enhancement
Mar 09	Multi-State Planning Meeting in Georgia	Program Enhancement
May 09	Multi-State CPE in North Carolina	Program Enhancement
Jul 09	AWOP National Meeting in Cincinnati	Program Enhancement
Jul 09	Presentation and Panel on Documenting AWOP Impacts at AWOP National Meeting	Program Exposure
Sep 09	Annual SW Meeting – SC AWOP Awards Program	Reporting on Success & Program Exposure
Nov 09	Multi-State Planning Meeting in North Carolina	Program Enhancement

Description of Tools & Site Selection

There were no activities in this area in 2009.

Building Awareness & Recognition

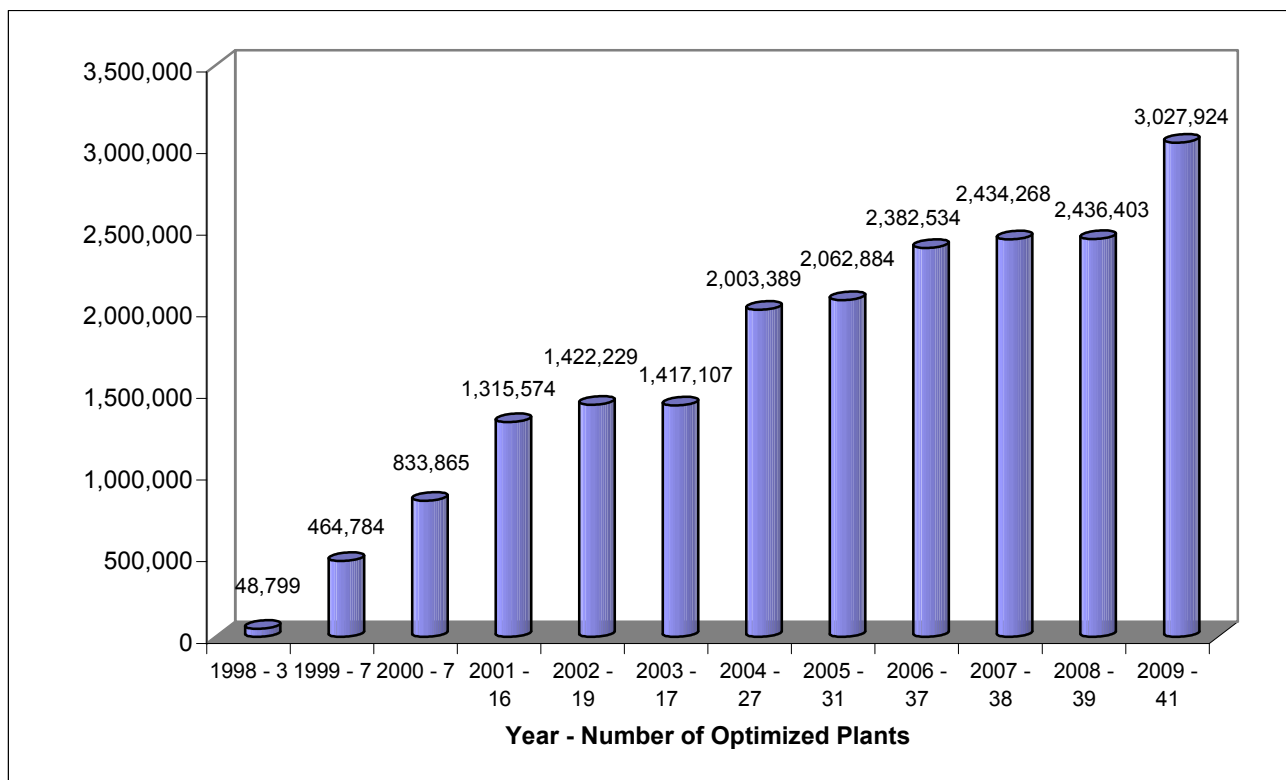
The AWOP awards and recognition program, started in 2001, was again held in conjunction with our annual surface water meeting. The Commissioner of DHEC, the Deputy Commissioner for EQC, and the Chief of the Bureau of Water attended the program. In addition, EPA Region 4 sent two representatives that attended the entire meeting. All of the distinguished guests gave positive remarks and enthusiastically supported the program. Each guest was willing to share their time to recognize and award the plants that met the optimized performance goals.

AWOP Impacts

Tangible Impacts from Targeted Activities

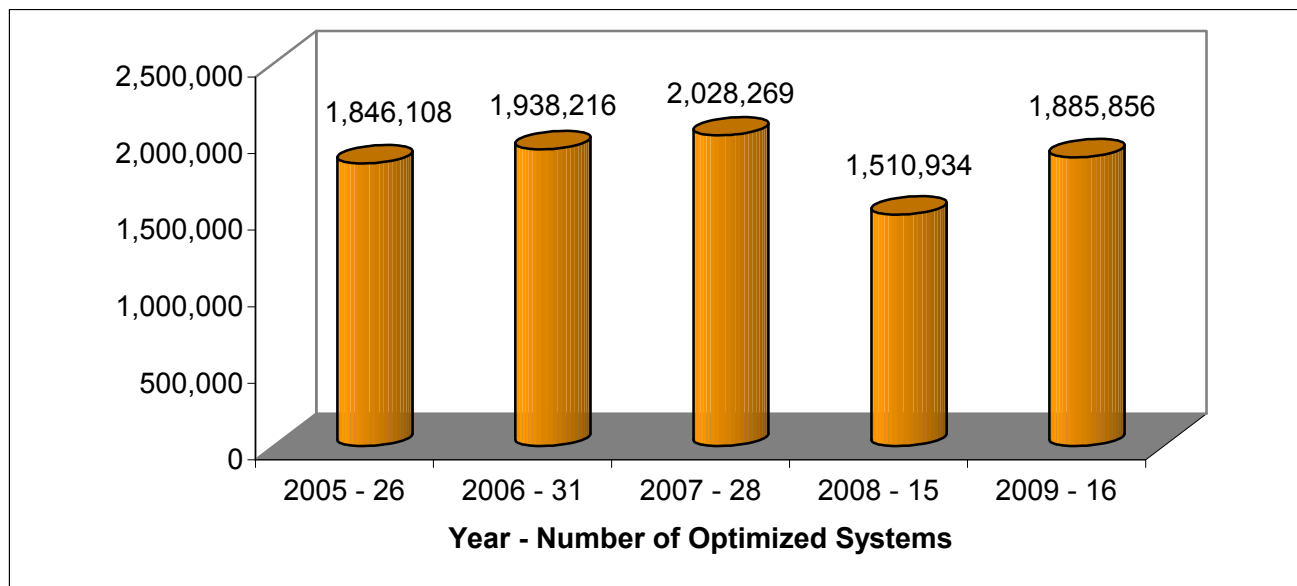
While there were more plants that met the optimization goals during 2009, there were no individual plant success stories. Another powerful impact of AWOP in South Carolina has been the number of citizens that receive water from an optimized plant. From the chart below, it can be easily seen that the number of plants that are optimized and consequently the service population has risen dramatically.

**Area-Wide Optimization
South Carolina Population Served By Optimized Plants**



The above chart shows the population served by optimized plants by year. The population served by optimized plants (met settled & filtered goal) was 48,799 in 1998 and over 3 million in 2009. In 2009, approximately 3.26 million people in South Carolina were supplied with drinking water from surface water plants (State population 4.5 million); and approximately 93% of those people received drinking water from a plant optimized for microbial protection.

**Population Served by DBP-Optimized Plants
South Carolina**



The above chart shows the population receiving water from a DBP-optimized plant. Most water systems in South Carolina do not have trouble meeting the TOC or THM goals. Of the 3.26 million people statewide supplied by surface water, 1.8 million or 55% were served drinking water by DBP optimized plants.

Intangible Impacts from Targeted Activities

1. Staff Training.

Staff training continues to be an important intangible benefit for our drinking water program. Our team had a new staff member join us early in 2009. Even though she came from the permitting side of the program, she didn't have a lot of knowledge related to operations and compliance. Through our strategic use of optimization knowledge, she quickly progressed and has a good grasp on not only compliance challenges plants face, but also what it takes to become an optimized plant. Most of our core team is once again trained on performing CPE's.

2. Relationships with the regulated community.

In addition, the relationship with the regulated community has also been enhanced through the optimization program. Water systems routinely ask for help to define and look for

solutions to treatment problems. Recently, several plants have had turbidity excursions due to extremely cold weather. At least five previous AWOP-award plants have had challenges and probably won't make the goals for 2010. After discussing both with the plants and with members of the NOLT, the plants were able to solve some of those treatment challenges. In one case, the plant had already taken the necessary steps, but was relieved when the "experts" agreed with their actions. These incidents help build powerful relationships that will make everyone's job easier and more fulfilling.

Lessons Learned

We have found that the regulated community wants to be well below regulations to prevent violations and enforcement actions. AWOP has been very helpful in South Carolina by reducing non-compliance, developing a better relationship with the regulated community, and building the expertise of our staff of water treatment professionals.

Attachments:

Bureau of Water – Drinking Water Protection Division Flow Chart

Drinking Water Protection Division

